

Solar Energy and Desalination Laboratory

The Laboratory for Solar Energy and Desalination Research is a unique facility in the world. It is Cyl's first field facility for experimentation and technology-testing in realistic conditions. Located in a prime location next to the sea in the area of Pentakomo in the south coast of Cyprus, the laboratory aspires to become a forefront regional facility for research, innovation and new technologies development for solar energy and desalination.

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Energy Research at the EEWRC/Cyl

Energy in all its forms is a most valuable commodity in developed societies. The energy sector of a country comprises of its generation, supply and consumption. The energy theme has been selected as one of the three main topics for the first research center of The Cyprus Institute (Cyl), the Energy, Environment and Water Research Center (EEWRC) due to the importance of energy in our society today. With respect to energy production, EEWRC explores novel concepts of utilizing concentrated solar power for the co-generation of electricity and potable water, through the de-

salination of seawater in an integrated facility, thus addressing two of the most pressing issues that Cyprus faces today. However, the most effective way of addressing energy supply lies in reducing energy consumption through efficiency measures. Research into new materials and holistic measures addressing energy efficiencies in buildings is also carried out. Research at the EEWRC addresses issues of significant national interest and provides insight and solutions to energy-related problems concerning the Republic of Cyprus today.

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The Cyl at the Science Museum in London

The exhibition 'Water Wars: fight the food crisis' hosted by the Science Museum in London prominently features The Cyprus Institute, presenting its scientific project in which concentrated solar power (CSP) is used to generate both desalinated sea water (DSW) and electricity.

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LinkSCEEM Thematic Workshop for Climate Research

In October 2011, the LinkSCEEM research project, which is establishing a High Performance Computing (HPC) eco-system in the Eastern Mediterranean region, organized its first thematic workshop, which dealt with climate research and was held at The Cyprus Institute, Athalassa Campus.

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A Hot Dry Future

Scientists from The Cyprus Institute have projected climate change for the 21st Century, using a regional climate model based on an intermediate emission scenario, and have predicted impacts on the environment. The research points towards substantial regional climate changes, with significantly dryer and warmer conditions.

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Energy Research at the EEWRC/Cyl - An Editorial

Energy in all its forms is a most valuable commodity in developed societies throughout the world. Its generation, supply and consumption constitute the energy sector of a country, which is subject to countless considerations and investigations. It should not, therefore, appear surprising that the energy theme has been selected as one of the three main topics for the first research center of The Cyprus Institute, the Energy, Environment and Water Research Center (EEWRC).

Energy research at EEWRC is pursued in two major directions: a) with regard to the generation of electricity from renewable sources and b) addressing energy efficiency in the built environment, i.e., in private and public buildings.

As to energy production, we are exploring novel concepts of utilizing concentrated solar power (CSP) for the co-generation of electricity and potable water through the desalination of seawater (DSW) in an integrated facility. Addressing two of the most pressing issues that Cyprus faces today in a comprehensive and sustainable manner is seen as the major advantage of this concept. We have already investigated the technical and economic feasibilities of such a CSP-DSW plant under the specific conditions of Cyprus, which can be similarly employed in comparable "island conditions" in other parts of the world.

The CSP-DSW concept also addresses the Water-Energy-Nexus on Cyprus, i.e., the various linkages between the water and the energy sector. Taking into account the fact that currently 250 GWh per year, i.e.,



4.8% of the total electricity consumption for 2008 (5 224 GWh) are being expended for desalinating 151 700 m³ of seawater per day, as well as the fact that the Cyprus government plans to expand the desalination capacity by 170 000 m³ to 321 600 m³ per day, which will require 530 GWh per year of electricity (i.e., 10.2% of the total consumption for 2008), this connection between water and energy becomes quite obvious. As of now, the growing desalination capacity is to be satisfied by reverse-osmosis plants run by electricity that is being produced conventionally, i.e., by the burning of fossil fuels. This will not only enhance Cyprus' dependence on foreign energy markets, it will also result in growing carbon dioxide emissions, which in 2008 already exceeded the EU-quota of 6.252 Mill. t by 2.151 Mill. t or 35%. Moreover, there is an increasing consensus that mastering today's challenges to satisfy increasing energy and water demands in water-scarce regions render "business-as-usual" approaches inadequate. This underlines the need to boost research activities that will pave the way to innovative technologies. The CSP-DSW concept, pursued at the EEWRC, may indeed represent such a technology.

However, the most effective way of addressing energy supply, lies in reducing energy consumption through efficiency measures. The residential sector alone accounts for one third of Cyprus' electricity consumption, a significant fraction of which is being used for space heating and cooling. Nonetheless, even modern buildings are not adequately insulated to reduce this demand. It is estimated that no more than 10% of current buildings in Cyprus are sufficiently insulated. This is where research into new materials and holistic measures addressing energy efficiencies in buildings starts at the EEWRC. Even older buildings can be made more energy efficient by adopting relatively simple retrofitting measures. A study carried out by The Cyprus Institute for the Cyprus government demonstrates that the Presidential Palace can be turned into a "green building" with significantly reduced energy needs, without compromising the historically valuable exterior of the building. Thus, research at the EEWRC/Cyl addresses issues of significant national interest and provides insight and solutions to energy-related problems facing the Republic of Cyprus today.

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LinkSCEEM Thematic Workshop for Climate Research

In October 2011, the LinkSCEEM research project, which is establishing a High Performance Computing (HPC) eco-system in the Eastern Mediterranean region, organized its first thematic workshop, which dealt with climate research and was held at The Cyprus Institute, Athalassa campus.

The objective of the workshop was to provide highly motivated trainees interested in the fields of climate modeling and high performance computing with fundamental skills in climate research and numerical modeling. The program covered topics in basic atmospheric physics and dynamics, coupling of complex sea-air regimes, numerical modeling of atmospheric flows and regional climate modeling.

The participants were given access to a LinkSCEEM e-Infrastructure supercomputer to perform their research. They will also have



the chance to attend a follow-up thematic workshop in 2012, in advanced climate modeling and high performance computing. The list of trainers included experts in atmospheric science, numerical modeling and high performance computing from Germany, Italy, Greece, Cyprus and Egypt.

The workshop was attended by 30 students from various scientific backgrounds and from countries from all over the Middle East and Europe, such as Lebanon, Egypt, Morocco, Pakistan, Cyprus and Germany.

<http://castorc.cyi.ac.cy/node/879>

Weather Research and Forecasting model used to compute the atmospheric dispersion of debris from the Mari explosion

Research scientists at The Cyprus Institute have computed the atmospheric dispersion of debris from the Mari ammunition explosion on 11 July, 2011, using the Weather Research and Forecasting (WRF) model. A high-resolution computational model of the atmosphere was used together with meteorological observations, starting at 6 a.m local time. The explosion cloud was computed by initializing the explosion aerosol plume up to a height of 5.5 km over the Mari site. The computer simulations revealed that at all height levels the plume was dispersed towards the Mediterranean Sea by the prevailing westerly winds, thus preventing fallout of debris over populated areas.



The Cyl at the Science Museum in London

The Cyprus Institute is prominently featured in an exhibition at the Science Museum in London regarding the planet's shortage of fresh water. According to the exhibition, this shortage is likely to get much worse. In search of solutions, the museum features five new technologies which may help.

The exhibition entitled 'Water Wars: fight the food crisis' presents Cyl's project in which Concentrated Solar Power (CSP) is used to generate both Desalinated Sea Water (DSW)

and Electricity. The accompanying website (<http://antenna.sciencemuseum.org.uk/waterwars>) explains all five solutions and interviews the researchers and engineers behind them. The page on the Cyl project, 'Sun Worshipers', features an interview with coordinator Dr. George Tzamtzis, in which he explains: 'As a Mediterranean island there are two things we have lots of: sun and sea water. CSP desalination will use these natural resources to produce fresh water for Cyprus.'

<http://www.cyi.ac.cy/node/1320>



SCIENCE AND ARCHAEOLOGY The Antikythera Mechanism Exhibition

In summer 2011 Cyl co-organized with the Research Group for the Study of the Antikythera Mechanism (Aristotle University of Thessaloniki) the Exhibition "Science and Archaeology: The Antikythera Mechanism". The exhibition marked the inauguration of the recently renovated 'District Officer's Residence', the new campus of the Cyl in Paphos. This historical building will be the new headquarters of the Science and Technology in Archaeology Research Center (STARC) and the venue for other activities of the Institute, such as marine research in archaeology and environment, as well as a venue for conferences, exhibitions, summer schools, lectures and seminars. During the inauguration ceremony, the Honourable Minister of Communication and Works, Dr. Kozakou Marcoulli (currently minister of Foreign Affairs), delivered a speech on behalf of the President of the Republic.

The exhibition featured the first international presentation of the new working replica of the celebrated mechanism built by a team of scientists from the Aristotle University of Thessaloniki.

The 1900 discovery of the mechanism in an ancient shipwreck near Antikythera Island remains a milestone for the history of science and technology, as the device was capable of highly accurate astronomical and calendar calculations. The scientists from the Aristotle University have created the new working replica of the mechanism based on interdisciplinary and technologically sophisticated research. The replica reveals secrets of the mechanism lost for over 2000 years.

<http://www.cyi.ac.cy/node/1382>



Solar Energy and Desalination Laboratory

A critical infrastructural step for the Energy Division of the EEWRC has been taken with the completion of the first phase of the Pentakomo Solar Energy and Desalination Field Laboratory. The main objective of the Laboratory is to gain knowledge and experience in pioneering solutions to address the problems of desalination and power generation from renewable sources, and to test these technologies in realistic conditions in a coastal environment. The Cyprus government, which has supported and endorsed this initiative, has already proposed and designated the Laboratory as a "Euro-Mediterranean" project within the framework of the Union for the Mediterranean (UfM).

The facility has been in development since late 2010. Fencing and ground works have been completed, and the first temporary facilities for researchers and equipment have been installed, effectively rendering the facility operational and ready to accept experiments. A full-fledged meteorological station, courtesy of the Cyprus Meteorological Service was installed in 2010 and has been gathering location-specific data ever since. In the next phase of development, a permanent building will be constructed offering ample office and laboratory space for extensive preparation of experiments in a closed and completely-controlled environment prior to their relocation for tests outdoors.

The Solar Energy and Desalination field laboratory is a unique facility in the world. Situated in the south coast of Cyprus next to the sea, the laboratory aspires to become a forefront regional facility for research, innovation and new technologies development for solar energy and desalination. In recent years it has become apparent that solar technologies need to be examined carefully in the harsh conditions of coastal areas and adapted appropriately to withstand the corrosive and windy environment of islands. This in fact has been a key outcome of the now-completed Cyl's techno-economic feasibility study for solar thermal co-generation (the CSP-DSW project). There is now an urgent need to research and develop another generation of systems suitable for deployment in the Mediterranean coasts and islands. The Pentakomo

***A unique facility
in the world allowing
for controlled experiments
in realistic conditions***

field testing laboratory comprises an excellent infrastructural investment for carrying out such tests in realistic conditions, but in a fully monitored research environment.

The facility will primarily host the experimental solar thermal co-generation unit of the 2-year,

€1.3m project on "Solar Thermal Production of Electricity and Water (STEP-EW)", funded under the EU INTERREG III scheme. It will spearhead the research efforts of the EEWRC's Solar Energy and Desalination group and provide a platform for extensive experimental setups and testing of units which are under construction. Principal amongst them is the Cyl's custom-designed state of the art heliostat of high efficiency in solar collection and the recently patented new design concept for an integrated solar receiver and storage system.

Two more projects have already been scheduled to be hosted at the facility in collaboration with prominent institutions, attesting to the advantageous nature of the facility. The first experiment to be installed is a Solar-Desalination unit in collaboration with Fraunhofer ISE. The unit is completely self-sustained and uses a series of Photovoltaic panels (PV) to power the Reverse Osmosis desalination module and pump the water from the sea. The experiment, whose installation began in late August 2011, is expected to be operational before the end of the year. A similar in scope experiment in collaboration with MIT is also expected to be installed at the Pentakomo facility in early 2012.

The Pentakomo Solar Energy and Desalination Field Laboratory will not only benefit Cyprus but the entire region as well. This forefront research and testing facility will be open to companies and other academic institutions to conduct their experiments and tests, and will provide high-end technical and validation services promoting innovation and technology transfer. This is in the plans of The Cyprus Institute and it is part of its strategy to foster innovation and to evolve the Laboratory to become a full-fledged innovation cluster focusing on solar energy and desalination.

<http://eewrc.cyi.ac.cy/CSP-DSW/CSP-DSW>

A HOT DRY FUTURE

Climate change and impacts in the Eastern Mediterranean and Middle East - A regional climate assessment by The Cyprus Institute

The Eastern Mediterranean and the Middle East (EMME), has become a global climate change 'hot spot'; it is widely viewed, including the most recent IPCC studies, as one of the big 'losers' of the climate change that the planet is experiencing. To understand the implication of EMME's shifting climate patterns, the research group of Cyl under the leadership of Prof. Jos Lelieveld, have projected climate change for the 21st Century, using a regional climate model based on an intermediate emission scenario, and predicted impacts on the environment. The research points towards substantial regional climate changes, with significantly dryer and warmer conditions.

The mean temperature is expected to rise by about 1-3 °C in the next three decades, 3-5 °C by mid-century and 3.5-7 °C by the end of the century, in a much faster rate than the global mean. Precipitation is also expected to decline in the north by 10-50% during the 21st Century. In the south, precipitation may actually increase due to the expanding influence from the humid tropics, though this is modest in absolute terms.

The predicted warming and drying of the region will have major consequences for humans and natural ecosystems. Air quality is expected to decline and increasing dryness will lead to escalating vegetation fires. The EMME has several megacities in which air quality is already seriously degraded and ozone levels are expected to continue to increase. There is compelling evidence that the maximum daytime temperatures in the region are increasing rapidly, which will lead to extended heat waves with major consequences for city dwellers. In addition, vector-borne parasitic and viral diseases are expected to increase. Climate change will also affect the land ecosystems and agriculture. EMME has a high biodiversity and the predicted drying and warm-



The research points towards substantial regional climate changes, with significantly dryer and warmer conditions

ing may dramatically alter the balance of species in the region. Projections suggest that the milder winters in the north will be associated with lengthening of growing season, which could positively influence agriculture. However, this will likely be overshadowed by the increasing number of hot days and the decreasing soil moisture. Furthermore, there is expected to be a warming of water temperature, while increasing salt content and sea level may rise by about 1.3-2.5 cm per decade. Marine biodiversity will

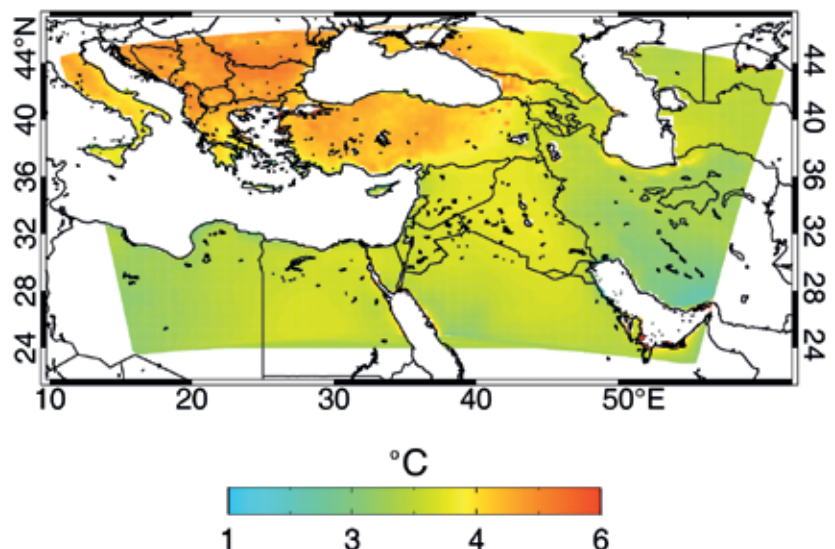
be affected by decreased nutrient availability, with marine ecosystems becoming more 'tropical' and the invasion of alien species.

Parts of the EMME are already notorious for fresh water scarcity. The predicted decreasing rainfall will result in a river discharge decrease of 10-30% by the end of the 21st century and a significant reduction in the availability of freshwater, with important social and economic implications.

Fossil fuels dominate the energy supply in the EMME and this use is growing at one of the highest rates in the world. This energy demand will grow in parallel with water deficits, which exerts additional pressure on energy production. Alternative sources of energy and improved energy efficiencies are therefore critical for the EMME region. The Cyprus Institute is pursuing an extensive research program in the development of renewable energy systems and in particular solar.

<http://eewrc.cyi.ac.cy/climatechangemetastudy>

Changing daytime summer temperature by mid-century



International Workshop: Energy Issues facing Cyprus



Mrs Praxoula Antoniadou Kyriacou, Minister of Commerce, Industry and Tourism.

The Cyprus Institute in collaboration with the Cyprus Industrialists and Employers Federation and the Electricity Authority of Cyprus organized in October 2011 a Workshop entitled "Energy issues facing Cyprus". In this one-day workshop the participating scientists reviewed the current energy issues facing Cyprus today, in the light of the

catastrophic explosion at Mari and with the prospect of significant deposits of natural gas in the Exclusive Economic Zone of Cyprus. The overall situation was examined within a regional European and international context. The principal goal was to reach a first scientific set of conclusions, identify areas where further research is needed and refine the policy agenda. The workshop hosted numerous notable speakers from prestigious international universities and institutions. The conclusions of the Workshop and the resulting research initiative that will emerge will be presented at the forthcoming meeting of the Scientific Council of the Institute.

Mrs Praxoula Antoniadou Kyriacou, Minister of Commerce, Industry and Tourism addressed the workshop which was attended by scientists from organizations across the country.

http://www.cyi.ac.cy/energy_workshop

2011 Hubert Curien Memorial Lecture

The Hubert Curien Memorial Lectures are an annual series of lectures that honor Prof. Hubert Curien, Founding Chair of our Board of Trustees. Since 2006, the Lecture has been the centerpiece of the Institute's annual program. This year, the guest speaker was Anastasios P. Leventis and his lecture was entitled "Economics and the Environment: Business as Usual? A Charitable Foundation Faces the Question".



The guest speaker Anastasios P. Leventis.

Dr. Leventis described the evolution of anthropogenic threats to the environment and to the future sustainability of human society and of life on earth as we know it. He summarized steps that have been taken so far to mitigate these threats and suggested options for remedial action which can be adopted at different levels of society.

Anastasios Leventis is a Director of the Leventis Group International Companies and the Chairman of the A. G. Leventis Foundation. He has been involved in international activities which encourage sustainable models of development. He has supported biodiversity conservation in many countries and encouraged research and education in this field.

The President of the House of Representatives Mr. Yiannakis Omirou addressed the lecture.

<http://www.cyi.ac.cy/node/1291>

From University Research to Industrial Innovation

The Cyprus Institute in collaboration with the Research Promotion Foundation and the Cyprus Employers and Industrialists Federation organized a lecture entitled 'From University Research to Industrial Innovation: Best Practices and Pitfalls in Technology Transfer'. The guest speaker of the lecture was Ms Lita Nelsen, Director of the Technology Licensing Office at the Massachusetts Institute of Technology (MIT).



Ms Lita Nelsen, Director of the Technology Licensing Office at the Massachusetts Institute of Technology.

Economic globalization brought with it new challenges and opportunities. Cyprus

cannot compete in this new environment unless it becomes more innovative and responds more effectively to consumers' needs and preferences. The lecture aimed to present the role of higher educational institutions as a pathway for the diffusion of ideas from university to industry. The MIT is one of the leading institutions in converting the results of fundamental university research into industrial innovation and economic development. MIT has patents issued on over 150 new inventions per year and grants up to 100 licenses.

Cyl and MIT have a strategic partnership which underpins the development of the Energy, Environment and Water Research Center. Cyl is receiving technical help and advice from the MIT Technology Licensing Office, in managing and developing intellectual property and innovation strategies.

<http://www.cyi.ac.cy/node/1331>

Cooperation Agreement between the Cyl and OEB

A Cooperation Agreement between the Cyprus Employers and Industrialists Federation (OEB) and The Cyprus Institute was signed in June 2011.

The partnership aims to strengthen and further develop the entrepreneurship and competitiveness, as well as to promote research, innovation and technology which are vital for the Cypriot economy.

This cooperation confirms the parties' intention to create perspectives where the local enterprises can use the research expertise and infrastructure of The Cyprus Institute in combination with the long and broad experience of the Cyprus Employers and Industrialists Federation. The two bodies will jointly assist the development, modernization and strengthening of Cypriot businesses and the general economy by applying their combined knowledge, experience and expertise.

In the framework of this collaboration, events such as the Workshop 'Energy Issues facing Cyprus' and the Lecture 'From University Research to Industrial Innovation: Best Practices and Pitfalls in Technology Transfer' by the Director of the Technology Licensing Office of the Massachusetts Institute of Technology, have already been co-organized with OEB. These events are aiming to promote and enhance the important role of research and innovation in Cyprus.



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New appointments at The Cyprus Institute

• **Prof. Nikolaos Mihalopoulos** was recently appointed as Professor at the Energy, Environment and Water Research Center. Prof. Mihalopoulos received his PhD in Chemistry from the University of Paris 7. He served as Professor of Atmospheric Chemistry, Department of Chemistry at the University of Crete. He also served at the University of Crete as member of the research committee, president and vice-president of the Department of Chemistry and president of the post-graduate studies committee.

• **Prof. Aristides Bonanos** was appointed as Assistant Professor on Energy Research at the Energy, Environment and Water Research Center. Aristides Bonanos is working on the cogeneration of electricity and desalinated water using concentrated solar power project (CSP-DSW). He has a BSc in Aerospace Engineering, from the University of Virginia and an MS and PhD in Aerospace Engineering, from the Virginia Tech. He was previously a Post-Doctoral Scholar in Aeronautics at the California Institute of Technology Pasadena, USA.

CYI UPDATES

New recruitment at the Office of Innovation and Sponsored Research

Dr. Anastasia Constantinou was recently appointed as the Director of Innovation and Sponsored Research. Amongst her tasks is to design and implement the innovation strategy and policies of the Institute and to set up and manage the Institute's Technology Transfer & Innovation office, as well as the Institute's relationship with industry. She will also advise and support the researchers of the Institute on securing international grants. Anastasia brings in a long experience in this field, having worked in industrial, academic and consulting services in the UK, Cyprus and Greece.

I N B R I E F

The Cyprus Institute's President elected to Academia Europaea

The President of The Cyprus Institute, Prof. Costas N. Papanicolas was elected to the Academia Europaea. Membership to the Academia Europaea, also known as the Academy of Europe, is by invitation only, based exclusively on scientific merit. There are now approximately 2,300 members, including 38 Nobel Laureates, drawn from across the whole of Europe. Its membership includes leading experts from the physical sciences and technology, biological sciences and medicine, mathematics, letters and humanities, social and cognitive sciences, economics and law. Prof. Papanicolas has the distinction of being the first scholar in the Academy to be drawn from Cyprus. Nobel Prize winner and Cyl Trustee Prof. Christoforos Pissarides, has also been elected to the Academy.

<http://www.cyi.ac.cy/node/1349>



The President of The Cyprus Institute, Prof. Costas N. Papanicolas.

2011 Dirac Medal and Prize awarded to Cyl's Chairman of the Board of Trustees



Prof. Edouard Brézin, Chairman of The Cyprus Institute's Board of Trustees was awarded in August the "2011 Dirac Medal and Prize" by the International Center for Theoretical Physics.

The Medal has been awarded to Professor Edouard Brézin, Professor John Cardy and Professor Alexander Zamolodchikov in recognition of their independent pioneering work in field theoretical methods for the study of critical phenomena and phase transitions; in particular, their significant contributions to conformal field theories and integrable systems. Their research and the physical implications of their formal developments have had important consequences in classical and quantum condensed matter systems and in string theory. The Dirac Medal is awarded annually to scientists who have made significant contributions to theoretical physics.

Dr. Petros Kareklas awarded the Grade Chevalier dans l'Ordre de la Légion d'Honneur

Dr. **Petros Kareklas**, until recently Permanent Secretary of the Ministry of Justice and Public Order, formerly Permanent Secretary of the Ministry of Defence and a founding Member of The Cyprus Institute's Board of Trustees was awarded the Grade Chevalier dans l'Ordre de la Légion d'Honneur by the French President Nicolas Sarkozy, in recognition of his meritorious services in promoting bilateral relations between France and Cyprus. The Légion d'Honneur is the highest decoration in France for military and civilian achievements. It was established by law in 1802 and has been recognized by all political systems and governments since then. The President of the French Republic appoints all members of the Order by convention, on the advice of the Government. Non-French nationals receive this distinction for serving France or the ideals it upholds.

<http://www.cyi.ac.cy/node/1324>



The Future of Natural Gas



by Ernest J. Moniz

The boom in natural gas production in the United States, principally because of the technological developments for exploiting “unconventional” shale resources, has been an energy game-changer. Compared with other fossil fuels, natural gas burns cleanly and, because of both the molecular structure of methane and the high efficiency of natural gas power plants, it emits much less carbon dioxide per unit of output. These plants have low capital costs and, because natural gas power plants can ramp their output quickly, they can serve as an essential complement to inherently variable renewable sources, such as wind and solar – this is important for maintaining reliability and stability of the electricity system when there is large renewable deployment.

When used directly for heating and ap-

pliances in commercial and residential buildings, natural gas has a much higher overall efficiency and lower emissions than does electricity generated by other fossil fuels. Compressed natural gas vehicles are cleaner and less carbon-emitting than those fuelled by petroleum. For all of these reasons, natural gas is now viewed as a crucial bridge to a very low carbon future (see an extensive MIT report on The Future of Natural Gas at web.mit.edu/mitei/). It is easy to understand why the International Energy Agency in Paris issued its 2011 report The Golden Age of Gas in which it predicts a substantial increase in natural gas use in both developed and developing economies.

Natural gas is also important for industry, both as a heat source and as a petrochemical feedstock. Indeed the new-

When used directly for heating and appliances in commercial and residential buildings, natural gas has a much higher overall efficiency

found availability of ample natural gas at reasonable cost is leading to a renewal of manufacturing in the United States. The talk is now of exporting liquefied natural gas (LNG) as a valuable commodity rather than becoming reliant on an increasing stream of expensive imports.

The discovery of significant natural gas resources under the waters of the eastern Mediterranean holds the promise of a similar energy game-changing experience for Cyprus and some of its neighbors. Indeed, the discovery of these resources and of others, including bountiful shale gas, in consuming countries may over time substantially alter the global geopolitics not only of natural gas but of energy supply more broadly. Because of the expense and challenge of moving natural gas over long distances, whether by pipes crossing multiple borders or by LNG tankers, the availability of ample nearby resources should be a major benefit to the economy, security and environment of Cyprus.

Precisely because natural gas is so flexible and clean in its use – electricity, industry, home heating and appliances, transportation – integrated planning of the entire energy system is important at an early stage. The recent Cyprus Institute workshop on the future energy system for Cyprus is a good start. Having had the privilege to help establish the Institute and its Center for Energy, Environment and Water with a commitment to public service, I am pleased to see the original vision being fulfilled: bringing science and technology and objective analysis to bear on important challenges facing Cyprus and the surrounding region.

Ernest J. Moniz is the ‘Cecil and Ida Green Distinguished Professor of Physics and Engineering Systems’ at MIT, Director of MIT’s Energy Initiative, 2008 Awardee of the Grand Cross of the Order of Makarios III and Member of Cyl’s Board of Trustees.



The discovery of significant natural gas resources under the waters of the eastern Mediterranean holds the promise of a similar energy game-changing experience for Cyprus and some of its neighbors (Photo: PIO).

